and the antiquity of man came to be the most absorbing topic of the day. That vexed question still remains a matter under discussion, although Prestwich, in some of his later articles, has sought rather to reduce than to extend the time-limits of man's existence.

Subjects of practical importance from time to time engaged his attention. In 1851 he published "A Geological Inquiry respecting the Water-Bearing Strata of the country around London," a work which at once became the standard authority on the subject, and has lately been reissued with appendices. The author took a prominent part on the Royal Commission on Metropolitan Water Supply in 1867, and his services were again in request on the Royal Coal Commission, to the reports of which, published in 1871, he contributed accounts of the Bristol and Somerset Coal-field, and of the probable extent of Coal-measures beneath the Secondary rocks of the south and south-east of England. Agreeing generally with the conclusions of his friend Godwin-Austen, he was led to infer that concealed coal-fields might extend from Somersetshire eastwards to the neighbourhood of Folkestone. Subsequent explorations at Dover have shown the correctness of these theoretical views.

Prestwich was elected a Fellow of the Royal Society in 1853, and was appointed a Vice-President in 1870. In that same year he was chosen President of the Geological Society, and in the course of his two addresses he dealt with the subjects of deep-sea researches, and water-supply.

His attention had been given at various intervals to the later Tertiary deposits, and in 1871 his three great papers on the structure of the Crag-beds of Suffolk and Norfolk were published by the Geological Society. So much had been written by others on these very fossiliferous strata, that the author had not scope for so much originality as was the case with his Eocene researches. These later papers were, however, characterised by the same exhaustive treatment of the subject, in the record of many sections, and in the enumeration of the organic remains. His memoirs on the Pliocene or Crag formations were eventually followed by a series of articles dealing with more recent deposits. In the meanwhile Prestwich, who had retired from business in 1872, was offered the chair of Geology at Oxford, vacant through the death in 1874 of John Phillips. It came rather as a surprise to his friends that a man who had achieved such distinction and had earned repose should again go into harness. A young and ardent teacher would, however, at that time have been out-of-place, and, as events proved, no one better than Prestwich could have been selected to fill the post with such advantage to the University.

One result of his labours in Oxford was his large and handsomely illustrated work, in two volumes, entitled "Geology Chemical, Physical, and Stratigraphical"—a work in which he opposed the strictly uniformitarian teachings of some geologists, and urged that, though the agents were similar in kind in past ages, they were not similar in degree to those of the present day. Retiring from Oxford in 1888, Prestwich again surprised his many friends by his renewed activity. Paper after paper issued from his pen, dealing with the most difficult problems connected with the later superficial deposits—notably his memoir read before the Royal Society on the "Evidences of a Submergence of Western Europe and of the Mediterranean Coasts at the close of the Glacial or so-called Post-Glacial Period." He dealt also with the rudely-made plateau flint-implements of the Chalk Downs, many of them found near his Kentish home. Although individually they would not attract much notice, he maintained that these rudely-chipped flints bore traces of human workmanship, and collectively showed evidence of a peculiar type of earlier date than the ordinary Palæolithic implements.

These later writings of Prestwich have initiated many new lines of inquiry, even if they have failed to carry conviction to all his readers.

The last honour bestowed upon him, in the early part of this year, was that of knighthood, which he was unable to accept in person from Her Majesty owing to his feeble health. He died on June 23, at his home, Darent Hulme, near Shoreham. H. B. W.

NOTES.

The Albert Medal or the Society of Arts has been awarded, with the approval of H.R.H. the Prince of Wales, the President of the Society, to Prof. David Edward Hughes, F.R.S., "in recognition of the services he has rendered to arts, manufactures, and commerce by his numerous inventions in electricity and magnetism, especially the printing telegraph and the microphone."

The Swiss Society of Electrical Engineers is organising an International Electrical Congress, which is to take place at Geneva from August 4 to August 9 next, under the presidency of M. Turrettini. The following subjects are to be discussed at the Congress: (1) Magnetic Units, (2) Photometric Units, (3) Transmission and Distribution of Power to Great Distances by means of (*a*) Direct Currents, (*b*) Alternate Currents, (4) Protection of High-pressure Overhead Electric Lines against Atmospheric Discharges, (5) Various Disturbances caused by Electric Traction. Further information can be obtained from the Bureau du Congrès International des Électriciens, Université, Genève.

It has been proposed that some token of esteem be presented to Prof. N. Story-Maskelyne in recognition of his distinguished services to mineralogical science, and to commemorate his long connection with the University of Oxford. The presentation is intended to take the form, if possible, of a portrait, and it is believed that contributions not exceeding £2 in amount will be sufficient for the purpose. A number of men of science, both at home and on the continent, have already promised their support. Contributions will be received by Prof. A. H. Green, F.R.S., or Prof. H. A. Miers, F.R.S., University Museum, Oxford.

The Board of Managers of the New York Botanical Garden have issued the first number of a *Bulletin*, containing the Act of Incorporation, and a map of the site for the Garden granted by the Commissioners of Public Parks. By agreement with the Trustees of Columbia College, the botanical library and herbarium belonging to that institution will be deposited in the Botanical Garden. The endowment fund of 250,000 dols. required by the Act of Incorporation has now been fully subscribed. The President of the Board of Managers is Mr. Cornelius Vanderbilt; the Secretary, Prof. N. L. Britton.

Mr. Austin Corbin, who was killed a few days ago in New Hampshire, had acquired a herd of fifty buffalo, which he kept in his preserves in that State. It was his intention to lend the animals for an indefinite period to the city of New York, and a plot of eighty acres in Van Cortlandt Park, in the northern (annexed) portion of the city, had been prepared for them, having been surrounded by a fence seven feet high. The plan will be carried out by his representatives, and the herd will be moved in the autumn; the delay being caused by apprehension that change of climate during hot weather might prove pernicious. This measure may avert the threatened extinction of the buffalo, which has now been almost extirpated on the western plains.

Mr. J. H. T. Tudsbery has been appointed Secretary of the Institution of Civil Engineers, in succession to Mr. James Forrest, who has retired.

A Reuter telegram from St. Petersburg says:—"Despatches from Irkutsk announce that M. Hansen, the Norwegian trader, left that town on June 1 for the north of Siberia. His journey is primarily for trading purposes, but he will also inquire into the truth of the recent rumours regarding Dr. Nansen, and see if the store of provisions left by Baron Toll in the New Siberian Islands for Dr. Nansen is still intact. M. Hansen's mission has been confided to him by the Russian Imperial Geographical Society."

The cruellest deed committed for the gratification of feminine vanity is the destruction of small white herons or egrets, during the season in which they have their nests and young, in order to supply plumes for ladies' hats. By persistent appeals the Society for the Protection of Birds have induced a small proportion of the gentler sex to give a thought to the conditions under which their borrowed plumes are obtained, and a slight feeling against the fashion of wearing feathers has been aroused. But fine feathers are so essential to feminine decoration, that the slightest excuse is sufficient to salve the conscience. Happy were the ladies, therefore, when they were told by shopkeepers that lovely delicate plumes for the decoration of hats were now artificially made, and no peculiar cruelty was necessary to obtain them. But their complaisance has been disturbed. Sir William Flower has examined numbers of plumes, the wearers of which were priding themselves on their humanity, trusting to the assurance of the milliner that they were not real egret's feathers, but manufactured, and he has found in every case that they were unquestionably genuine. The only "manufacture" consisted in cutting the plume in two, and fixing the upper and lower half side by side, so that a single feather does duty for two in the "brush." Simply to keep up their trade and dispose of their stock, the purveyors of female raiment have invented and widely propagated a monstrous fiction, and are everywhere selling the real feathers warranted as artificial! "Thus," concludes Sir William Flower, "one of the most beautiful of birds is being swept off the face of the earth, under circumstances of peculiar cruelty, to minister to a passing fashion, bolstered up by a glaring falsehood."

In order to determine the highest possible speed that may be attained on railways, trial runs were lately made between Berlin and Lübbenau on the Berlin and Görlitz line, states the *Engineer*; and for these runs a special express engine of new design with four cylinders and driving wheels of 2 metres (6ft. 6in.) diameter has been constructed, thus giving the engine a much greater height above the rails than usual. The composition of the trains was very various, amounting sometimes to 100 axles. With a train of 30 axles the highest performance, viz. 106 kiloms. (65¾ miles) per hour was recorded, being 20 kiloms. (12 miles) more than the highest speed hitherto attained by the quickest German lightning train (Blitzzüge), viz. the Berlin Hamburg D-Zug, which runs through a distance of 286 kiloms. (177½ miles) in 3½ hours, while the speed of ordinary German expresses is only 70 kiloms. (43½ miles) per hour. The portions of lines chosen for the runs were tolerably horizontal over their whole length, and had very few curves.

Outbreaks of anthrax are by no means easy to trace to their fountain-head; and the Canton of Zürich has recently been much exercised over the appearance of anthrax in a district where this disease had previously been unknown. Dr. Silberschmidt, one of the assistants of the Hygienic Institute attached to the University of Zürich, has been entrusted with the task of ferreting out, if possible, the means by which anthrax has been introduced. Suspicion had fallen upon a horse-hair factory in the vicinity of the infected area, where the raw material employed emanated principally from Russia, from which country it is imported direct *viâ* Leipzig, in large bundles weighing over a hundredweight. These bundles are subjected to no process whatever of sterilisation or cleansing; and as cases of anthrax, whilst rarely met with amongst horses in Switzerland and other European countries, are comparatively frequent in Russia, the suspicion of this factory being the probable source of the trouble seemed justified. Careful examinations of some of this horse-hair, and also of the dust in the factory, revealed the undoubted presence of anthrax germs; thus the dissemination of anthrax appeared to be readily accounted for, and its distribution in the spore form as dust, in consequence of the extraordinary vitality of anthrax spores, renders it a particularly dangerous foe to deal with. It has been suggested to the authorities that Russian horse-hair should be sterilised on the frontier, or at any rate in Leipzig, in special apparatus arranged for the purpose, as, after the raw material has been distributed to small factories, the expense of sterilisation renders its being successfully carried a matter of great difficulty.

The vexed question in the theory of fluid friction, whether finite slipping does or does not take place at the surface of a solid in contact with a liquid, forms the subject of a contribution, by Dr. Antonio Umani, in a recent number of the *Nuovo Cimento*. The experiments were conducted in the physical laboratory of the University of Parma, the apparatus used consisting of a cylindrical box filled with mercury, and suspended by a torsion fibre. In one series of experiments the sides of the box were nickel-plated, so that the mercury did not actually wet the metal; in another series, the mercury was made to bathe the sides of the box by thoroughly amalgamating the latter. In the former case, the presence of a film of air between the mercury and nickel was obviated by filling the box *in vacuo*. The observed values for the logarithmic decrement of the amplitude of the oscillations were found to differ in the two series of experiments by an amount which, Dr. Umani considers, indicates finite slipping between the mercury and the box when the latter is nickel-plated. The author further proceeds to calculate the internal coefficient of viscosity of mercury from the results of his second series of experiments, and obtains the value $\eta = 0{\cdot}01577$ C.G.S. units at temperature 10° C. Warburg, employing Poiseuille's method, had previously obtained at temperature $17^\circ{\cdot}2$ C. the value 0·01602.

In the *Bulletin* of the Royal Academy of Belgium, M. Léon Gerard contributes the results of some observations on the seat of emission of Röntgen rays, and their mode of propagation in air. The rays emanating from a Crookes' tube were allowed to pass through three diaphragms, and the emergent pencil of light was received on a photographic plate placed in different positions, so as to give both transverse and oblique sections of the pencil. By comparing these various sections, M. Gérard has been led to the conclusion that Röntgen's statement, according to which air is much less absorbent to Röntgen rays than to kathodic rays, is inexact. He considers that both kinds of rays possess the analogy of not travelling exactly in straight lines, and that, in accordance with the views of Lénard, atmospheric air is a turbulent medium for kathodic manifestations, and that their transmission takes place as in a turbulent medium, such as stearin or milk. M. Gérard's second conclusion, namely, that Röntgen rays only emanate from the surface of the glass on which kathodic rays fall, is in accordance with the numerous investigations described in previous numbers of Nature.

The action of Röntgen and other rays on the higher animals has been studied by Prof. Stefano Capranica (*Atti R. Accad. dei Lincei*). The subject selected for observation was *Mus musculus*, and the experiments referred chiefly to the quantity of carbon dioxide exhaled in the process of respiration. Prof. Capranica states the following conclusions: (1) The amount of CO_2 is the same in darkness as in diffuse daylight. (2) The respiration of *Mus musculus* is greatly affected by strong sunlight, even when all heat-rays have been screened off; and the effect is the same for rays from all parts of the spectrum. (3) Artificial lights, such as the electric light or incandescent gas, act like sunshine when concentrated on the animals, but have no effect when merely used to light a room. (4) The light from Geissler's tubes has no effect. (5) Röntgen rays have no action on the quantity of CO_2 eliminated from the animal, whatever be the conditionof the latter; that is, whether fasting or after feeding, whether previously kept for several hours in darkness, or *vice versâ*. (6) What was observed with each of the six moles experimented on was strong excitement, which continued for several hours after the experiments with Röntgen rays had ceased. The moles, after being exposed to Röntgen rays for one hour, ran about in a nervous and excited way, and would not eat. (7) This excitement Prof. Capranica attributes to the electrical effects of the Röntgen rays. (8) Experiments on cold-blooded animals (*Coronella*) give, as yet, no appreciable results.

THE meteorological and astronomical work accomplished during 1895 in the Observatory of the Mersey Docks and Harbour Board, are stated by Mr. W. E. Plummer in a report just received. Appended to the general tables is a catalogue and short discussion of all the gales of wind that have been automatically recorded with velocities equal to, or exceeding, fifty miles per hour. Several interesting points are brought out by the catalogue. It appears that the average length of a storm at Liverpool, as defined by the condition that the wind velocity shall exceed fifty miles per hour, is about six hours; while the average number of stormy hours in a year does not greatly exceed sixty. With regard to the time of year in which these disturbances occur, general experience points to a connection between them and the observed temperature. This agreement is very clearly shown by Mr. Plummer in a diagram having a curve exhibiting the number of stormy hours in each month, and an inverted temperature curve. The two curves very markedly coincide with one another. By means of two other diagrams Mr. Plummer shows the connection between barometric height and wind velocity; the variation of the barometer being taken from the time when no indications of a gale were apparent to the time when the disturbance ceased. There is a distinct difference between these variations and the wind velocity in the cases of winter and summer storms. In the winter, the fall of the barometer coincides with some approximation to the increase in the severity of the storm, but on the average the time of minimum barometer precedes the time of maximum velocity by about four hours. The mean length of time from the beginning to the end of the storm is twenty-six hours, of which twelve are occupied in the increase, and fourteen in the decrease of violence. The rise in the barometer after the time of maximum velocity is more marked than in the fall, and the mercury stands considerably higher at the end than at the beginning In the summer, the average length of time embracing the whole of the disturbance is reduced to twenty-two hours. The fall of the barometer as the storm gathers force is very slight, and on the average only amounts to 0·04 inch, while the minimum barometer occurs five hours before the maximum wind velocity. In nearly half the storms examined the barometer rose steadily throughout the whole of the disturbance. Mr. Plummer could find no instance of a storm occurring in the summer months when the barometer stood above 30 inches: in winter, 10 per cent. of the storms were developed at that pressure.

THE seventh volume of the *Geographical Journal* (new series), containing the monthly numbers from January to June of this year, has been published with commendable promptitude. The volume is a wonderfully interesting record of travel and discovery, and, with its notes, descriptive lists of geographical literature, new maps, and illustrations, it is an invaluable publication to geographers.

A SERIES of sixteen reproductions of photographs obtained by means of Röntgen rays, together with text (in Japanese) explanatory of the methods by which they were obtained, has been received from Prof. Y. Yamaguchi and T. Mizuno, of Tōkiō University. The photographs are much less distinct than those obtained since the introduction of the focus tube, but they nevertheless show that Japan means to keep in the van of scientific progress.

A CONTRIBUTION to the theory of warning colours and mimicry appears in the *Journal* of the Asiatic Society of Bengal (vol. lxv. Part ii. No. 1, 1896). Mr. Frank Finn, Deputy Superintendent of the Indian Museum, has tested the taste of the common garden lizard of India (*Calotes versicolor*) for various insects, and especially for butterflies protectively coloured and plain. Mr. Finn thinks the behaviour of the reptiles at liberty does not afford support to the belief that the butterflies, at any rate, usually considered nauseous, are distasteful to them.

WE understand that the next instalment of the "System of Medicine," which Prof. Clifford Allbutt is editing for Messrs. Macmillan and Co., will deal with Gynæcology, and will appear in the course of September. Dr. Playfair is associated with Prof. Allbutt as editor of this volume, which, though uniform with the system, will be complete in itself. The second volume of the "System of Medicine" proper may be expected by the end of the year. Messrs. Macmillan and Co. will also shortly issue a work on "Deformities," by Mr. A. H. Tubby. It is a comprehensive treatise on orthopædic surgery, and is fully illustrated by two hundred original plates and figures, and notes of one hundred cases.

THE June number of the *Journal* of the Chemical Society is an exceptionally bulky one; it runs into nearly four hundred pages, seventy-five of which are taken up with abstracts of papers. A distinguishing feature of the number are the four detailed accounts contained in it of Hofmann and his work. These are:—"Personal Reminiscences of Hofmann and of the conditions which led to the establishment of the Royal College of Chemistry and his appointment as its Professor," by Lord Playfair; "The History of the Royal College of Chemistry and Reminiscences of Hofmann's Professorship," by Sir F. A. Abel; "The Origin of the Coal-Tar Colour Industry, and the Contributions of Hofmann and his Pupils," by Dr. W. H. Perkin; and "Notes on Hofmann's Scientific Work," by Dr. H. E. Armstrong. Students of chemistry will find these descriptions full of interesting personal reminiscences, and will derive from them an idea of the marvellous amount of work which Hofmann accomplished.

THE Lepidoptera collected in Eastern Africa by Dr. W. L. Abbott have been determined by Dr. W. J. Holland, and a list of them, with some other collections, is given in an excerpt from the *Proceedings* of the U.S. National Museum (vol. xviii. pp. 229-279). The collection from Eastern Africa was found by Dr. Holland to contain only a small number of species new to science, the great majority being species well known from other localities, and noticeably from temperate South Africa, many of them species named in the last century. It is pointed out that the presence of an *Argynnis* and a *Chrysophanus* in the collection is peculiarly interesting, and suggests to the student the thought that when a more thorough exploration of the lofty heights of Kilimanjaro, Kenia and Ruwenzori shall have been made, there will be some very remarkable, if not astonishing, facts brought to light as to the geographical distribution of animals. A collection made by Dr. Abbott in the islands lying west and north of Madagascar in the Indian Ocean, also possesses interest as illustrating the geographical distribution of genera and species. Dr. Holland finds it to be made up of certain genera possessing great capabilities for migration, and apparently a strong power to resist change under varying conditions. The other collections of Lepidoptera described by Dr. Holland in the excerpt referred to, were obtained from Somaliland, by Mr. W. A. Chanler and Lieut. von Hoehnel; and from Kashmir, by Dr. Abbott.

THE Connecticut Agricultural Experiment Station was established in 1877 "for the purpose of promoting agriculture by scientific investigation and experiment." The nineteenth annual report, containing an account of the work carried on during 1895, shows that both the science and practice of agriculture are advanced by the researches at the Station. The papers on the agricultural value of fertilisers and the availability of nitrogen alone furnish the materials for a liberal education in agriculture. Hundreds of analyses have been made in the chemical laboratory, while diastase—the sugar-forming ferment of sprouting seeds—and the proteids of the potato, malt, pea, vetch, and other plants have been studied, and new results obtained with reference to them. Experiments on the efficacy of the corrosive sublimate treatment of potato seed, where the land which is planted with potatoes is already fully infested with the potato-scab fungus, showed that the treatment was of little avail in preventing scab upon the crop. It was found that the addition of lime in quantities to the soil of the experimental field increased the amount of scab. The dreaded San José scab appeared in Connecticut for the first time in 1895, and great credit is due to the State Experiment Station for the prompt and thorough manner in which they gave nurserymen information regarding the occurrence, characteristics, and life-history of the insect, and the methods which have proved successful in eradicating it. Many other matters occupied the attention of the staff of the Station during the year covered by the report, and the results have been made known to the farmers of Connecticut. All the work proper to the Station that can be used for the public benefit is done without charge. Further, we read: "Every Connecticut citizen who is concerned in agriculture, whether farmer, manufacturer, or dealer, has the right to apply to the Station for any assistance that comes within its province to render, and the Station will respond to all applications as far as lies in its power." This announcement is sufficient guarantee that the Station is never in want of subjects for investigation, and the *Bulletins* and Reports published from time to time testify to the great value of the work undertaken and results obtained.

THE additions to the Zoological Society's Gardens during the past week include three Indian Stock Doves (*Columba eversmanni*), a —— Duck (*Nyroca baeri*), three —— Hemipodes (*Turnix dussumieri*) from India, presented by Mr. Frank Finn; a Peba Armadillo (*Tatusia peba*) from South America, eight Bell's Cinixys (*Cinixys belliana*) from Angola, a Maximilian's Terrapin (*Hydromedusa maximiliana*) from Brazil, a Madagascar Boa (*Pelophilus madagascariensis*), a Madagascar Tree Boa (*Corallus madagascariensis*) from Madagascar, deposited; two Plantain Squirrels (*Sciurus plantani*) from Java, an Occipital Vulture (*Vultur occipitalis*) from Africa, two Burmeister's Cariamas (*Chunga burmeisteri*) from the Argentine Republic, two Crowned Partridges (*Rollulus cristatus*) from Malacca, twelve Spotted Tinamous (*Nothura maculosa*) from Buenos Ayres, two Chilian Teal (*Querquedula creccoides*) from Antarctic America, two Shamas (*Cittacincla macrura*), a Malabar Green Bulbul (*Phyllornis aurifrons*) from India, a —— Sand Snake (*Psammophis schokari*), a Hissing Sand Snake (*Psammophis sibilans*) from Egypt, purchased; a Brush-tailed Kangaroo (*Petrogale penicillata*), two Spotted Pigeons (*Columba maculosa*), two Triangular-spotted Pigeons (*Columba guinea*), two Vinaceous Turtle Doves (*Turtur vinaceus*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

DECLINATIONS OF FIFTY-SIX STARS.—The definitive declinations and proper motions of fifty-six stars have been determined at the Columbia College Observatory (*Contributions*, No. 8). The stars in question were selected by Profs. Fergola and Jacoby for observation at Naples and New York by the Talcott method, for the determination of the variation of latitude, and for the calculation of the constant of aberration by Küstner's method. Prof. Jacoby commenced the investigation, but ill-health compelled him to relinquish it, and it was continued by Mr. Davis. The discussion of the declinations was undertaken with the object of obtaining results based upon all available observations, so as to make this part of the work of value as an independent research. The memoir involves observations recorded in no less than 130 star catalogues, and represents an enormous amount of painstaking computation.

GRAPHICAL PREDICTION OF OCCULTATIONS.—The usual methods of deriving the local circumstances of an occultation, either graphically or by calculation, are somewhat lengthy and tedious, but a new construction, described by Major Grant, R.E., in the June number of the *Geographical Journal*, is rapid, simple, and sufficiently accurate for most purposes. With the aid of a convenient diagram the parallaxes in declination and right ascension of any heavenly body are readily determined, and when applied to the moon the elements of an occultation are easily deduced. It is stated that after a little practice the whole process can be performed in about twenty minutes, and that, with moderate care, the error of the time of disappearance or reappearance should not exceed ten minutes, while the angles of ingress and egress need not differ more than one or two degrees from those calculated. Separate copies of the paper, with the diagrams suitably mounted, can be obtained on application to the Royal Geographical Society.

MASS OF THE ASTEROIDS.—In a paper under the title of this note (*Ast. Nach.*, No. 3359), G. Ravené attempts to determine the most probable mean value of the total mass of the minor planets, on the basis of the secular perturbations of the perihelion point of Mars. The best result given in Newcomb's recent work on the subject (*Bull. Ast.*, xiii., January 1896), shows that the perihelion motion of Mars is not entirely that given by theory, unless an empirical amount of about 5″·55 in a century be taken into consideration. It is obvious that at least part of these perturbations may be attributed to the disturbing force of the minor planets, and this is rendered more probable when Barnard's recent measures of the diameters of the four chief asteroids are taken into account. From these it was concluded that the asteroids are by no means so small as the previous photometric measurements had indicated, and it is not certain that such data are useful for a precise estimate of the mass of these small bodies.

An asteroid like Ceres, having a diameter of about 485 miles, will have a mass of about 1/4000th part of the earth's mass, if we assume it to have an equal density. It is thus quite likely that in a considerable length of time the total mass of all the asteroids will be sufficient to cause appreciable perturbations of the elements of a neighbouring planet.

In considering the theory of this action, it is assumed that the asteroids are distributed in an elliptical ring round the sun, and by noting the excess of perturbation produced on neighbouring bodies, using Gauss's method for calculating secular perturbations, the mean mass of the ring is found to be = 1/37,130,000 the sun's mass, or = 1/115 the earth's mass.

VARIABLE STARS.—Harvard College Observatory *Circular*, No. 7, gives particulars of the discovery of seven new variables, and also of the confirmation of variability in three stars previously suspected by other observers. Three of the variables have spectra of the *third* type, showing also bright hydrogen lines. Three others have spectra of the *fourth* type. The star −33° 14076 was found to be variable by Colonel E. E. Markwick, of Gibraltar, but no photographic confirmation was obtained until Mrs. Fleming ascertained that a star having a peculiar spectrum was identical with this. Detailed examination of all the plates of this region, eighty-nine in number, then showed it to vary in magnitude from 11·3 to 6·4. The spectrum of the star has bright lines which show evidence of change.

A large number of observations has been made with the meridian photometer to determine the forms of the light